CENTRAL INTELLIGENCE AGENCY
INFORMATION REPORT

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1. In 1953 and 1954, the East German Academy Institute for Research on the Physics of Solids in Berlin-Buch carried out selenium research for the purpose of making selenium monocrystals. For this purpose, the selenium was purified through fractional distillation until it was spectrally pure. The Institute studied the rectifier qualities of the selenium monocrystals through the addition of defined impurities, and it succeeded in improving these qualities. The apparatus for the purification of selenium was transferred to VEB Gleichrichterwerk Gross-Raeschen, where it has been used for the production of selenium rectifiers.

2. In March 1955, the Berlin-Buch Institute resumed selenium research for the purpose of obtaining selenium monocrystals of better quality than those obtained previously. The method previously used was confined to purifying the selenium from metal impurities. Fractional distillation, as carried out originally, did not sufficiently eliminate the air, i.e., the oxygen impurities. The presence of oxygen disturbed the crystallization process. This difficulty was overcome by the following method, which has been applied since March 1955. The spectrally pure selenium is sublimated in high vacuum (vacuum power minus five Torr); by this process Se_2 molecules are formed and the oxygen is either released or combined with selenium to form selenium dioxide. The Se_2 molecules, which are produced in vaporized form, precipitate and form oxygen-free selenium filaments (Faeden) during the cooling process. This purified selenium is melted at a temperature of 220° Centigrade and then solidified by cooling. The solidified selenium is sublimated in high vacuum at a temperature of 200° Centigrade. The sublimated substance is precipated upon the cooler areas of the heating tube in the form of monocrystals. These monocrystals are foils of about 3 millimeters in length, 1 millimeter in width, and one-tenth milimeter in thickness. 25X1

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(Note: Washington distribution indicated by "X"; Field distribution by "#".)

3. The selenium monocrystals thus obtained are now being investigated for their electrical and optical qualities. The Institute plans to use these monocrystals as "vaccination nuclei" (Impfkeime) for the drawing of larger monocrystals from pure molten selenium according to the Czrochalski method. As of early May 1955, the Institute had not yet succeeded in developing larger selenium monocrystals by this method but it was expected that this result would be obtained in the near future. The Institute claims that this will be the first time that large selenium monocrystals will be produced, not from the vapor state (Dampfphase) of the selenium, but directly.

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